

LESSON

5.5

Name _____ Date _____

Study Guide

For use with pages 242–246

GOAL**Divide fractions and mixed numbers.****VOCABULARY**Two nonzero numbers whose product is 1 are **reciprocals**.**EXAMPLE 1****Dividing a Fraction by a Fraction**

$$\frac{15}{16} \div \frac{10}{24} = \frac{15}{16} \cdot \frac{24}{10}$$

Multiply by reciprocal.

$$= \frac{\overset{3}{\cancel{15}} \cdot \overset{3}{\cancel{24}}}{\underset{2}{\cancel{16}} \cdot \underset{2}{\cancel{10}}}$$

Use rule for multiplying fractions.
Divide out common factors.

$$= \frac{9}{4}$$

Multiply.

$$= 2\frac{1}{4}$$

Write fraction as a mixed number.

✓ Check To check, multiply the quotient by the divisor to see if you get the dividend:

$$2\frac{1}{4} \cdot \frac{10}{24} = \frac{\overset{3}{\cancel{9}} \cdot \overset{5}{\cancel{10}}}{\underset{2}{\cancel{4}} \cdot \underset{8}{\cancel{24}}} = \frac{15}{16} \checkmark$$

Solution checks.

Exercises for Example 1

Find the quotient.

1. $\frac{5}{7} \div \frac{16}{21}$

2. $\frac{3}{5} \div \frac{9}{15}$

3. $-\frac{15}{23} \div \frac{45}{46}$

4. $-\frac{18}{35} \div \left(-\frac{24}{25}\right)$

EXAMPLE 2**Dividing a Mixed Number by a Mixed Number**

$$-3\frac{1}{8} \div \left(-1\frac{1}{14}\right) = -\frac{25}{8} \div \left(-\frac{15}{14}\right)$$

Write mixed numbers as improper fractions.

$$= -\frac{25}{8} \cdot \left(-\frac{14}{15}\right)$$

Multiply by reciprocal.

$$= \frac{\overset{-5}{\cancel{25}} \cdot \overset{-7}{\cancel{14}}}{\underset{4}{\cancel{8}} \cdot \underset{3}{\cancel{15}}}$$

Use rule for multiplying fractions.
Divide out common factors.

$$= \frac{35}{12}$$

Multiply.

$$= 2\frac{11}{12}$$

Write fraction as a mixed number.

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Exercises for Example 2

Find the quotient.

5. $2\frac{22}{25} \div 3\frac{3}{10}$

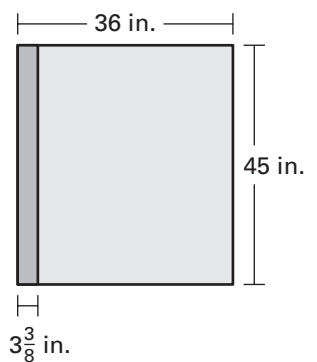
6. $23\frac{3}{4} \div \left(-8\frac{1}{3}\right)$

7. $-8\frac{2}{5} \div 5\frac{3}{5}$

8. $-21\frac{2}{3} \div \left(-2\frac{1}{6}\right)$

EXAMPLE 3 Dividing a Whole Number by a Mixed Number

You are cutting strips of cloth out of a 36-inch by 45-inch piece of cloth. You want each strip to be 45 inches long and $3\frac{3}{8}$ inches wide. How many strips can you cut out of the cloth?

**Solution**

Divide to find how many strips you can cut out of the cloth.

Number of strips = Cloth width \div Width of each strip

$$= 36 \div 3\frac{3}{8}$$

Substitute values.

$$= \frac{36}{1} \div \frac{27}{8}$$

Write numbers as improper fractions.

$$= \frac{36}{1} \cdot \frac{8}{27}$$

Multiply by reciprocal.

$$= \frac{\cancel{3}^4 \cdot 8}{1 \cdot \cancel{27}_3}$$

Use rule for multiplying fractions.
Divide out common factor.

$$= \frac{32}{3}$$

Multiply.

$$= 10\frac{2}{3}$$

Write fraction as a mixed number.

Answer: Because you cannot use fractions of a strip, you can cut 10 strips out of the cloth.

Exercises for Example 3

Find the quotient.

9. $72 \div 9\frac{3}{5}$

10. $-45 \div 1\frac{11}{19}$

11. $-6\frac{3}{10} \div (-14)$

12. $7\frac{1}{17} \div 40$